TABLE 2.—*Free-air resultant winds (meters per second) based on pilot balloon observations made near 7 a. m. (E. S. T.) during January, 1932*

[Wind from N=360°, E=90°, etc.]

Altitude (meters) m. s. l.	Albuquerque, N. Mex. (1,528 meters)		Brownsville, Tex. (12 meters)		Burlington, Vt. (132 meters)		Cheyenne, Wyo. (1,873 meters)		Chicago, Ill. (198 meters)		Cleveland, Ohio (245 meters)		Dallas, Tex. (154 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Havre, Mont. (762 meters)		Jacksonville, Fla. (14 meters)		Key West, Fla. (11 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°		°		°		°		°		°		°	
Surface	26	0.8	153	0.5	215	2.1	293	5.2	255	2.9	221	4.7	62	0.1	249	0.9	292	2.5	245	3.1	333	0.5	87	3.4
500	------	------	152	4.5	217	5.6	------	------	237	7.3	232	8.3	200	1.2	244	3.0	292	2.5	------	------	163	3.3	104	8.0
1,000	------	------	172	4.8	240	6.2	------	------	245	10.3	252	9.6	291	3.4	252	5.4	316	6.2	257	6.5	198	5.6	114	6.6
1,500	------	------	203	5.2	254	7.4	------	------	258	10.6	252	11.8	282	5.8	265	7.3	302	7.1	274	9.7	223	6.4	123	4.9
2,000	296	0.7	218	6.4	283	10.3	290	7.0	268	13.4	256	15.1	278	9.4	281	9.7	287	7.8	280	9.8	263	6.9	125	3.9
2,500	261	4.9	160	2.2	------	------	298	9.7	------	------	248	13.3	264	12.2	272	10.8	286	9.8	281	9.6	285	6.0	127	1.8
3,000	272	8.7	------	------	------	------	299	9.7	------	------	------	------	265	12.4	------	------	284	8.8	289	9.6	------	------	205	2.1
4,000	261	4.9	------	------	------	------	291	11.2	------	------	------	------	252	17.8	------	------	------	------	------	------	------	------	------	------
5,000	280	13.3	------	------	------	------	265	11.0	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------

Altitude (meters) m. s. l.	Los Angeles, Calif. (217 meters)		Medford, Oreg. (410 meters)		Memphis, Tenn. (89 meters)		New Orleans, La. (25 meters)		Oakland, Calif. (8 meters)		Oklahoma City, Okla. (392 meters)		Omaha, Nebr. (299 meters)		Phoenix, Ariz. (356 meters)		Salt Lake City, Utah (1,294 meters)		Sault Ste. Marie, Mich. (198 meters)		Seattle, Wash. (14 meters)		Washington, D. C. (10 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°		°		°		°		°		°		°	
Surface	357	1.3	206	0.5	167	1.5	41	2.0	76	0.2	201	0.7	331	1.7	125	1.3	156	24	305	1.0	156	1.0	318	1.8
500	58	1.1	262	0.6	218	4.5	103	2.8	348	3.4	220	2.6	306	3.1	102	1.7	------	------	307	2.6	182	3.8	283	6.8
1,000	27	2.9	164	1.5	249	6.5	203	3.7	347	7.0	255	6.8	286	5.8	107	0.4	------	------	286	1.0	194	5.0	293	10.2
1,500	27	4.7	194	1.2	259	7.5	266	3.8	339	7.4	258	7.7	269	8.1	258	1.5	186	2.7	271	3.6	221	3.8	287	12.2
2,000	2	6.1	243	2.6	262	8.5	254	7.6	336	7.6	260	9.5	275	9.3	256	3.2	219	1.8	------	------	------	------	284	16.3
2,500	334	6.6	257	3.6	261	9.1	257	8.9	340	8.1	256	10.4	273	11.2	265	4.6	265	2.6	------	------	------	------	283	14.7
3,000	330	7.5	250	2.6	247	11.5	258	10.0	337	7.5	259	13.7	------	------	271	7.7	291	5.2	------	------	------	------	------	------
4,000	348	11.6	295	3.0	------	------	------	------	328	9.7	------	------	------	------	291	12.5	------	------	------	------	------	------	------	------

WEATHER IN THE UNITED STATES

[Climatological Division, OLIVER L. FASSIG in charge]

THE WEATHER ELEMENTS

By M. C. BENNETT

The marked features of the weather for January, 1932, were the abnormally high temperature in the East and decidedly low temperature in the West.

The average temperature for the month ranged from 4° to 12° above normal east of the Great Plains, with the greatest departure above normal from the Ohio Valley northward, eastward, and southeastward, some stations in the Middle Atlantic States showing the warmest January in 100 years. On the other hand, the western portion of the country was decidedly cold, with the greatest deficiencies ranging from 5° to 10°.

The precipitation was generally heavy in sections having the warmest weather and was excessive in much of the south Mississippi Valley; large areas received from two to more than six times the January normal, while in marked contrast some nearby sections, as eastern Florida, southern Texas and the northern Plains received only 50 per cent or less of the usual amount. West of the Rocky Mountains precipitation was generally light, many sections receiving less than normal.

TEMPERATURE

The general situation in January was much the same as that prevailing since the middle of November, 1931; remarkable mildness continued in the eastern half, while low temperatures were the rule in the far West. The greatest temperature excess during January was found farther to northeastward than before, and the middle Plains region, instead of averaging warmer than normal, was now colder than normal.

The mildness in the eastern half was comparatively steady, while in the West the southern Plateau region was almost constantly colder than normal. The opening week was especially warm compared with normal in the north-central portion and particularly cold in Utah and districts adjacent. During the latter part of the first decade, while warmth continued in the East, temperatures above normal prevailed in the Pacific States and the far Northwest, particularly in Montana. The first half of the second decade had about the warmest weather ever known in January in the upper and middle Mississippi Valley and thence eastward to the Atlantic coast. However, the middle and latter portions of this decade were cold in most of the central and northern Plains and almost throughout the West.

The final decade of January began with warmer weather in Montana and the Plains, and with marked warmth continuing in the Lake region, the upper Ohio Valley, and to eastward, but with notable cold in most of the Plateau region. About the 28th a decided cold wave reached Montana and North Dakota whence it spread westward, southward, and eastward, so that the month closed with low temperatures prevailing in all but the southernmost States. The arrival of this cold wave ended in several districts prolonged periods remarkable for absence of low temperatures. For example, Harrisburg, Pa., had every day warmer than normal from December 10 to January 30, inclusive, January 13 being 32° warmer, and Keokuk, Iowa, reached 1° below zero on January 30, the first below-zero reading at that place since January 29, 1930, two year and one day earlier.

The month averaged warmer than normal in the eastern half of the country and in most of Oklahoma and Texas,

also in northern portions of North Dakota and Montana. The excess was large to eastward of the Mississippi River, averaging about 12° from the upper Ohio Valley eastward and northeastward. Usually in Michigan and near Lake Ontario, and almost invariably east of the Appalachian crest from the Carolinas to southern New England, this was the warmest January of record. At New Haven, Conn., it was the warmest January of 154 whose temperatures are known. Frequently in the Middle Atlantic States the departure from normal was found to be greater than the positive or negative departure of any other month of record at any season of the year.

In most of Nebraska and the central and western portions of Kansas and South Dakota, and practically throughout the Rocky Mountain States and the far West, save parts of Montana, the month averaged colder than normal. In Utah, Arizona, and eastern Nevada, the deficiency was 4° to 7° per day; Phoenix, Ariz., found this the coldest month whatever in a record of 36 years, save one December.

The highest marks were about 80° as far north as Maryland, Kentucky, and Arkansas, also in part of southern California; while in southern Texas 91° was noted. On the other hand, from Wisconsin to the Dakotas and in some Plateau States 60° was nowhere reached. In the western half the highest marks occurred usually on the 8th, or during the middle decade; in the eastern half usually on the 13th, 14th, or 15th. At this time, scores of stations near or east of the Mississippi River noted the highest January temperatures they had ever recorded.

The lowest marks in Florida, Mississippi, and Louisiana were in the twenties, and zero was not reached south of New York, Michigan, Illinois, Missouri, and Kansas. From Wisconsin to the Dakotas, however, and in most Rocky Mountain and Plateau States, the lowest was more than 30° below zero, one elevated station in Oregon even noting −41° on the 23d. In about two-thirds of the States, including nearly all of those wholly east of the Rocky Mountains, the lowest temperatures came on either the 30th or the 31st.

PRECIPITATION

For the nation as a whole, January was a month of ample precipitation. The distribution over the country was comparatively good; likewise the distribution through the month. However, the Atlantic and Gulf States received a large part of their monthly totals during the opening fortnight, and the central valleys about the middle of the month, while the closing week brought a large portion in California and Nevada, and in Tennessee and considerable parts of the States adjoining.

The monthly totals were decidedly greater than normal in Oklahoma and eastern Texas; indeed, in each of these States only one other January of record brought more than the present January. Kansas, southeastern Nebraska, and the western two-thirds of Iowa likewise had far more than normal. As a rule, there was much more than normal in the Ohio and lower Mississippi Valleys and moderately more than normal in southwestern Georgia and adjacent parts of other States, in the Middle Atlantic States and southern New England, and in the middle and western portions of the Lake region. Among the States, Mississippi and Louisiana had the greatest average amounts.

In the western half of the country there was usually somewhat more than normal in northeastern Wyoming and the western parts of the Dakotas, also in northern and eastern Nevada.

Precipitation was usually less than normal in northern California, central Montana, the eastern halves of the Dakotas, and especially in western and southern Arizona. The middle and lower Rio Grande Valley usually had less than normal precipitation, also the bulk of the Florida peninsula, and the immediate Atlantic coast to northward as far as Cape Hatteras. From central Missouri to southern Wisconsin there was generally less precipitation than in an average January.

As usual in winter, the largest monthly amount was reported by a station in Washington, 26.88 inches at Paradise Inn. East of the Rocky Mountain crest the greatest quantity was 17.82 inches at Swan Lake, Miss.

SNOWFALL

Once more the snowfall was very scanty from central and southern Missouri and northern Arkansas eastward over the Ohio Valley and southern Lake region to the Middle Atlantic States and southern New England. Many stations in this belt had decidedly less snow than ever before in January, and several, even as far north as Sandusky, Ohio, and Pittsburgh, Pa., had no measureable snow. Close to the Canadian boundary, as far west as Lake Superior, there was less than normal practically everywhere.

In a belt from southwestern Kansas northeastward to Minnesota the snowfall was decidedly heavy, often the greatest ever known in a January. The southern Rocky Mountain region and the central Plateau received, as a rule, far more than normal, and other parts of the far West usually had about as much as normal, save near the Canadian boundary, where the monthly totals fell short of normal. The supply of accumulated snow in the western mountains at the end of January was generally as great as or greater than normal, and in many districts the deepest for years, indicating a good stream flow during the coming spring and summer.

At Los Angeles, Calif., 2 inches of snow fell during the morning of the 15th, a greater amount than ever recorded there previously.

SUNSHINE AND RELATIVE HUMIDITY

Much cloudy weather prevailed in the region of the Great Lakes, the greater part of the New England States, the Great Central Valleys, Texas, and the northern portions of the Plateau and Pacific regions, while more than the usual amount of sunshine was received in the south Atlantic States, and in the southern portions of the Plateau and Pacific coast areas. Elsewhere about the average amount for January prevailed. The relative humidity was above the normal in the New England States, much of the South, and the central portions of the Great Plains the Rocky Mountain and Plateau regions, while elsewhere it was generally near or slightly below the seasonal average.